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PROOF THAT PRICEITE IS A DISTINCT MINERAL SPECIES[1]

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THE friable, chalky "priceite" from Curry County, Oregon, and the compact, nodular "pandermite" from Asia Minor have the same composition, which is near that of colemanite, and they are stated in most books on mineralogy to be massive or cryptocrystalline, impure colemanite. Optical study, however, while establishing the identity of priceite and pandermite, shows that they differ from colemanite in crystal system and in optical properties; it also shows that both the type priceite and pandermite are remarkably homogeneous, so that the analyses should represent the true composition of the mineral. The name priceite has priority and should properly be applied to the mineral.

The important optical properties of colemanite and those determined for priceite from Curry County, Oregon, and from Asia Minor, as given in Table 1 on the following page, show clearly the difference between the two minerals.

Not all fine grained, compact hydrous calcium borate is priceite; a number of such specimens from California localities labelled "priceite" or "pandermite" have been examined microscopically and all proved to be howlite. The two minerals can be very quickly and certainly distinguished by measuring the optical properties under the microscope, but I know of no other method save a careful chemical analysis.

This is one of the many cases in mineralogy in which a reasonably careful optical study of a mineral would have established its place in mineralogy when first discovered. In others the opposite is true: many so-called minerals would never have been named had they been given even a superficial, but intelligent, optical study. It is the conviction of the author that the optical properties of minerals—possibly excepting the rock-forming minerals—have been too greatly neglected, and when they have been measured it has too often been on material that is not represented by an accurate chemical analysis. What the science of mineralogy most needs is a careful study of particular minerals including, as well as the chemical properties, crystallography, and physical properties, which have heretofore been regarded as adequate, a discussion of the geological occurrence and relations, paragenesis, and optical properties. A careful statement as to the purity or uniformity of the material, determined optically, is rarely made, yet is of the utmost im-

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TABLE 1. COMPARISON OF THE PROPERTIES OF COLEMANITE AND PRICEITE

Properties	Colemanite	Priceite	
		Oregon	Asia Minor
Composition	$2CaO.3B_2O_3.5H_2O$	$5CaO.6B_2O_3.9H_2O$	$5CaO.6B_2O_3.9H_2O$
Crystal system	Monoclinic	Triclinic	Triclinic
Habit	Prismatic	Very minute rhombic plates with an angle of 58°±1°	Small rhombic plates
Cleavage	(010)per.(001)dist.		
Optical character	+	–	–
Axial angle (2V)	55°52′	Rather small	32°±2°
Dispersion	weak		$\rho < v$ rather strong
α	1.586	1.572±.003	1.573±.003
β	1.592	1.591±.003	1.591±.003
γ	1.614	1.594±.003	1.593±.003
Optical orientation	$Y=b, Z \wedge c=83$	X inclined to normal to plates. Crystals lying on flat face show $Y' \wedge$ bisectrix of acute angle of rhombs =14°±2°	X inclined to normal to plates. Turned on edge plates show $Z' \wedge$ elongation = 25° ± 2°
Specific gravity	2.42	2.26–2.48	

portance. Many apparently homogeneous bodies are mixtures and a large number of the minerals in nature show zonal growths at least as great as those of the plagioclase feldspars in rocks. A number of illustrations of the way in which optical study can solve disputed questions in mineralogy will be described in future notes.

OPTICAL EVIDENCE THAT "HYDROGIOBERTITE" IS A MIXTURE[1]

ESPER S. LARSEN

Three specimens labeled "hydrogiobertite," examined microscopically, have proved to be mixtures almost submicroscopic in fineness of crystallization, and as no careful microscopic examination of the original "hydrogiobertite" appears to have been made it is highly probable that it was also a mixture and that the mineral hydrogiobertite does not exist.

The so-called hydrogiobertite from Phillips Springs, California, analyzed by Dr. R. C. Wells,[2] of the U. S. Geological Survey, is made up of successive layers of very minute fibers with some quartz and other impurities. It is made up chiefly of two fibrous minerals but may have some amorphous material. One set of fibers has nearly parallel extinction with positive elongation, a lowest index of refraction α of $1.52 \pm .01$, and a birefringence that is not strong; it may be hydromagnesite. The other has a much lower index of refraction and a much higher birefringence. The two minerals are in part in separate layers, in part intimately intermixed.

A second specimen from Phillips Springs was similar but contained more hydromagnesite (?) and probably some amorphous material.

A specimen from Monte Somma, Italy, kindly furnished the author by Colonel Washington A. Roebling, was also finely crystalline and was made up chiefly of hydromagnesite with some mineral with higher index of refraction and lower birefringence.

There is thus good reason to believe that "hydrogiobertite" has no claim to recognition as a mineral species.

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[1] Published with the permission of the Director of the U. S. Geological Survey.

[2] *Am. J. Sci.*, [4] **30**, 189, 1910

HOW TO DETERMINE THE INDICES OF REFRACTION OF MINERALS

With this article we inaugurate a department devoted to methods of mineralogic investigation. Future numbers of the AMERICAN MINERALOGIST will contain similar notes on etching opaque minerals, methods of crystallographic measurement, how the structure of crystals is determined by X-rays, etc. Readers are invited to suggest additional subjects for treatment in this manner. —THE EDITORS.

The simplest method of determining the index of refraction of a mineral is by means of the BECKE test. Fragments of the mineral are best obtained by crushing on an anvil, sifting thru a sieve with approximately 100 meshes to the inch, and then thru a still finer one, and using the material which passes the former but not the latter. A minute amount is placed on a slide, moistened with a liquid of known index, covered with a small cover glass, and examined on the stage of a microscope with the substage lowered, and diaphragm nearly closed. On focusing sharply on the edge of the mineral and then throwing it slightly out of focus by *raising* the microscope tube, a line of light will be seen to move *toward* the substance (mineral or liquid) having the *greater* index of refraction. When the indices of the mineral and liquid are the same, no light will move in either direction; and, unless their colors are different, the mineral grain will become practically invisible. If a polarizer is attached to the microscope, two indices can be determined on the same grain (provided the mineral is doubly refracting) by making two observations with the same edge, one with it parallel and the other with it perpendicular to the plane of vibration of the polarizer. Some useful liquids for this purpose are, with their indices: kerosene, 1.45; clove oil, 1.53; bromoform, 1.59; α-monobromnaphthaline, 1.66; and methylene iodide, 1.74. Mixtures of these can be used for intermediate indices, but for accurate work the indices of both simple liquids and mixtures must be determined by a refractometer.

Elwood P. Hancock, of Burlington, N. J., whose collection included some exceptionally fine specimens of Franklin Furnace minerals, and who was further known to mineralogists as the discoverer of hancockite, died November 4, 1916, in his 82d year. His collection has been acquired by Harvard University.

A RARE HABIT AND NEW FORM OF FRANKLINITE

ALEXANDER H. PHILLIPS
Princeton University

Among some minerals recently obtained from Franklin, New Jersey, is a specimen of franklinite, which is very striking in appearance and habit. The crystals are small, less than a millimeter in diameter, implanted on rhombohedral crystals of a light pink rhodochrosite and contained in the angular cavities between the rhodochrosite crystals. The crystals of franklinite are of a very bright metallic luster, with a bluish tinge, resembling somewhat that of blued steel, but on fractured surfaces they are of the ordinary color and luster of franklinite. The edges or splinters do not show the red color noted by Palache[1] in his description of another specimen, to which these crystals are very similar in habit. They are combinations of the cube, octahedron and a tetrahexahedron, in which the three forms are very regularly and nearly equally developed, as indicated in the illustration, Figure 1.

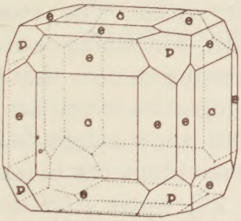

FIGURE 1.—DIAGRAM OF CRYSTAL OF FRANKLINITE, SHOWING NEW FORM *e*.

Upon measuring the angles, the tetrahexahedron *e* proved to be a form, with the indices (510), not heretofore noted on franklinite. The average of 10 measurements yielded:

Face	Measured		Maximum	Minimum	Calculated
	ϕ	ρ			
150	11° 17.6′	90°	11° 23′	11° 13′	$\phi = 11° 18'$
051	00°	78° 42′	78° 45′	78° 37′	$\rho = 78° 41'$

The quantitative composition of these crystals would be interesting for comparison, but the material is not sufficient for an analysis.

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[1] *Am. J. Sci.* [4], **29**, 177, 1910.

CHALCEDONY MISTAKEN FOR AN IRON SULFATE MINERAL[1]

EDGAR T. WHERRY AND MILTIADES L. GLENN
U. S. National Museum and Erie, Pa.

In the mineral collection of the U. S. National Museum there have been for many years two specimens of an orange-brown botryoidal mineral labeled glockerite. According to the catalog they were collected by Dr. Oscar Loew in 1874. Recently Dr. E. S. Larsen of the U. S. Geological Survey, in the course of compiling data on the optical properties of all available mineral species, examined fragments from these specimens but found them to be totally different from other glockerites, and suggested that analysis of them would be desirable. The Museum accordingly sent samples of both materials to Mr. Glenn, who has contributed the analytical data. Their properties and composition are recorded, in Table 1 (see opposite page) to emphasize the need for the thoro study of unusual-looking minerals, in order that they may be correctly labeled in collections.

Interpretation of the results: The specimens are evidently merely chalcedonic silica, containing ferric sulfate and water as impurities. It is interesting to note that the index of refraction and specific gravity, properties which are especially sensitive to changes in water content, show a definite inverse relation to this factor; thus for pure chalcedony the index is 1.537, for the specimen containing about 2% water 1.530 and for that containing over 3% water 1.525. Correspondingly, the specific gravities are 2.60, 2.57, and 2.55. Specimen 8430 agrees optically with what has been called lutecite, while 8431 is normal chalcedony. The ferric sulfate is not a stain, for it is not extractable by water nor by acids. It is not present as visible inclusions, for under the highest powers of the microscope the color of the mineral grains is entirely uniform. It must therefore be present in submicroscopic inclusions.

In conclusion, it may be pointed out that while the properties of this mineral agree in a rough way with the descriptions of glockerite given in the text-books, some tests should certainly have been made before it was so labeled. The use of something besides mere superficial aspect for identification can not be too strongly urged.

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[1] Published by permission of the Secretary of the Smithsonian Institution.

TABLE 1. PROPERTIES OF THE SPECIMENS

U. S. N. M. catalog number	8430	8431
Locality	Pinos Altos, New Mexico	Esmeralda Lode, Black Hawk, Colorado
Occurrence	Coating on pyrite and vein-quartz	Outer surface of chalcedony coating pyrite and vein-quartz
Color (Ridgway)	11 i. Orange rufous (55% orange and 45% black)	
Luster	Waxy-vitreous	
Hardness	7	
Specific gravity	2.57	2.55
Crystallization	Amorphous in appearance	
Structure	Botryoidal	
Fracture	Conchoidal	
Under the microscope	Pale orange irregular grains; with crossed nicols shown to be cryptocrystalline, and in part radiating-fibrous	
Optical properties:		
Mean index of refraction	1.530	1.525
Double refraction	.008	.008
Elongation optically	+	−
Extinction	Oblique, 20–30°	Straight
Qualitative tests	SiO_2 and traces of Fe_2O_3, SO_3 and H_2O	
Composition:		
SiO_2	94.37	93.94
Fe_2O_3	3.10[a]	1.58
SO_3	1.47[a]	1.00
H_2O below 110°	tr.	0.65
H_2O above 110°	1.86	2.59
Totals	100.80[a]	99.76

[a] Somewhat high, since a minute amount of pyrite could not be separated from the material analyzed.

THE CARR MINERAL COLLECTION

ALBERT L. STEVENS
Providence, R. I.

I WAS asked, recently, by the executor of the estate of the late Silas Carr of Jamestown, R. I., to inventory Mr. Carr's mineral collection. As is too often found in a case like this, not sufficient attention had been given to the labeling; and in overcrowded cases loose labels are apt to become misplaced, especially if the specimens have been handled by the inexperienced. Among other specimens without labels were several pieces of quartz in which are imbedded crystals of black tourmaline averaging nearly half an inch in diameter. Cross-sections of these show a core (from ⅓ to ½ the diameter of the crystal) of the quartz matrix which is glassy and a trifle smoky. Some of the crystals show that they have been broken and cemented together with the white quartz. I wonder if any of the readers of THE AMERICAN MINERALOGIST have noted similar specimens, and from what locality? Some of them strongly suggest Fitchburg, Mass.

Mr. Carr was an enthusiastic collector up to the time of his death, which occurred last May, in his 77th year. He was especially interested in Rhode Island minerals, in which he was well informed, and contributed to "New Finds," the most important of which is "sceptre" quartz, which he discovered in September, 1895, at North Kingstown. These are, indeed, interesting and beautiful little crystals, some of them being equal in form and brilliancy to the famous Herkimer crystals, while others are apparently iron-stained. In length they run from ¼ to ¾ inch, including the "stems," which in some cases are nearly twice the length of the "head." Comparatively few crystals show stems of much length but many show where stems have been broken off.

Another of Rhode Island's rarities is octahedrite, from Cumberland. I noted both matrix specimens and detached crystals. Among the other good Rhode Island minerals, I might mention elegant reticulated rutile from Johnston; a masonite specimen with plate nearly 3 x 6 inches, from Natick; amethyst groups from Westerly; a splendid suite of orthoclase and microcline, from a crystal ⅜ x 2 inches, sharp, perfect, with bright faces, up to crystals and groups 6 inches across, also from Westerly.

The collection also includes many specimens from outside of the state.

EDITORIAL

The date of issue of this magazine will be hereafter the 10th of each month; subscribers not receiving their numbers within a week or so after this date should inform the business manager; also, if all six numbers of volume I have not been received, additional copies of all but the first number can be supplied.

Attention of our subscribers and advertizers is herewith called to a change in the address of publication of the AMERICAN MINERALOGIST, as noted on the front cover. Mr. Rosenbaum has found that increasing college work will prevent him from giving adequate attention to our business any longer, so the business management has been taken over by Mr. Harry W. Trudell, and all business communications should hereafter be addressed to him. As heretofore manuscript of articles may be sent to any of the editors. All mineralogical organizations are invited to contribute accounts of their meetings and papers read before them.

The editors are sure that all of our readers will join us in extending the heartiest thanks to Mr. Rosenbaum for his share in the successful launching of the AMERICAN MINERALOGIST.

NEW YORK MINERALOGICAL CLUB

On Tuesday, November 7, 1916 (Election Day) a party of thirty members and friends made an excursion to Kinkel's quarry, Bedford, New York.

The following minerals were obtained: Asteriated quartz, autunite, beryl, columbite, cyrtolite, garnet, graphic granite, ilmenite, pyrite, muscovite, orthoclase, rose quartz, smoky quartz and black tourmaline.

At the regular meeting of the New York Mineralogical Club held at the American Museum of Natural History on November 8, 1916, after the election of several new members and the disposal of other routine business, Mr. Thomas I. Miller, for the Curators, stated that the collection of New York City Minerals on continual exhibition in the Museum had recently been rearranged in order to make it of greater interest to the public.

The President, Mr. James G. Manchester, then presented a paper as announced, on "The Minerals of the Bergen Archway, the Erie Railroad open cut, through Bergen Hill, New Jersey." The paper was profusely illustrated by a series of lantern slides showing the progress of the work on the cut and especially section No. 4, where the minerals were chiefly found, and of the minerals themselves; also by a large exhibit of the specimens described, many of which were subjects of the lantern photographs.

WALLACE GOOLD LEVISON, *Secretary.*

PHILADELPHIA MINERALOGICAL SOCIETY

THE WAGNER FREE INSTITUTE OF SCIENCE, November 9, 1916

A REGULAR meeting of the Philadelphia Mineralogical Society was held on the above date with President Trudell in the chair. Those present were Messrs. Allen, Benge, Biernbaum, Cameron, Egee, Gordon. Groth, Hagey, Jones, Knabe, Leffmann, Rothermel, Streland, Trudell, and Warford.

Mr. Benge proposed Mr. Joseph Wallace, Crum Lynne, Pa., and Mr. H. A. Warford, Philadelphia, for active membership. Dr. Leffmann read a proposed amendment to the By-laws to merge all committees into a single executive council to consist of the officers of the society, and three senior resident members. This amendment was adopted.

A symposium on geodes constituted the program of the evening, oral communications being made by Messrs. Cameron, Biernbaum, Egee, Leffmann, and Benge. Many specimens of geodes were exhibited.

Mr. Trudell reported the club trip to New Galena, with Messrs. Benge, Flack, Gordon, Hagey, Jones, Trudell, Vanartsdalen, Warford, and Wallace. Mr. Biernbaum reported a mineralogical trip with Mr. Rosenbaum along the Boardwalk in Atlantic City. Specimens of polished Paterson prehnite with glass ornaments were exhibited in a jeweler's window as genuine jade. Another exhibit consisted of "Kunzite—A member of the Diamond family," actually Herkimer "diamonds."

SAMUEL G. GORDON, *Secretary.*

NEW MINERALS

Hibbenite

Alexander H. Phillips: New zinc phosphates from Salmo, British Columbia. *Am. J. Sci.*, [4] **42**, (3), 275–278, 1916.

Name: After President John Grier Hibben, of Princeton University.

PHYSICAL PROPERTIES

Color: pale yellow, almost white. Translucent. Luster, somewhat pearly. Form: tabular crystals. H. about 3.75. Sp. gr. 3.213.

CRYSTALLOGRAPHIC PROPERTIES

Orthorhombic. $a:b:c = 0.589:1:0.488$.
Habit: tabular, ∥ *a* (100). Principal forms: *a* (100), *b* (010), *s* (120), *p* (111), and *d* (101).

OPTICAL PROPERTIES

Double refraction weak. Ex. ∥ on all three pinacoidal sections. Ax. pl. ∥ *c*. Optically −. $Bx_{ac} = b$. [The indices of refraction and axial angle, important diagnostic properties, are not given.]

CHEMICAL PROPERTIES

Comp. $2(Zn_3(PO_4)_2) \cdot Zn(OH)_2 \cdot 6\frac{1}{2}H_2O$.

ANALYSES

	1.	2.	Theoretical.
ZnO	57.51	57.60	57.625
P_2O_5	28.77	28.88	28.721
H_2O	13.74	13.68	13.653
	100.02	100.16	99.999

Observed with smithsonite, calamine, spencerite and an undetermined basic zinc phosphate (believed to be new) at the Hudson Bay mine, Salmo, British Columbia.

[The above properties are rather close to those of hopeite—Ed.]

S. G. G.

ABSTRACTS OF MINERALOGICAL LITERATURE

GUIDE TO THE MINERAL COLLECTIONS. Herbert P. Whitlock, of the N. Y. State Museum. *Rept. Director Sci. Div., Univ. State N. Y.*, **12**, 45 pp., 1916.

A concise and well-balanced introduction to the science of Mineralogy, with the special headings: classification, occurrence, and crystallization. A brief description of each of the minerals represented in the general mineral collection of the N. Y. State Museum at Albany is given. The collection of gems and gem minerals is also described and its arrangement explained. E. T. W.

CATALOG OF THE COLLECTION OF METEORITES. Oliver C. Farrington. Field Museum of Natural History, *Publ.*, *Geol. Ser.* **3**, (10), 231–312, 1916. 5 plates.

A catalog of the collection of meteorites in the Field Museum of Natural History (Chicago). 657 falls, with a weight of 7,566 kilograms are listed alfabetically, with a brief description, weight, and date of fall or find of each specimen. This large representation is due to the acquisition in 1912 of the Ward-Coonley collection (620 falls; 2,495 kilograms), which included the collection of James R. Gregory of London (406 falls), and that of Count Julien de Siemascho of Petrograd (402 falls). S. G. G.

THE CHEMISTRY OF MINERALS. Joseph E. Pogue of Northwestern University. *Eng. Mining J.*, **102**, (6), 255–259, 1916. Abstract reprinted by permission from *Chemical Abstracts*, **10**, (18), 2335, 1916.

A summary of our knowledge concerning variability in the composition of minerals. It is pointed out that while definiteness in composition has long been considered a fundamental feature of minerals, there are many cases now known where composition may vary within certain limits, and this variation may indeed be characteristic of a mineral rather than an accidental circumstance. "To focus upon the constancy of minerals and overlook their variability is to miss half their meaning." Crystals may contain inclusions and these may vary down to submicroscopic sizes, yet still be detected by analysis. Colloidal phenomena, especially adsorption, frequently cause variability in composition. In crystallized minerals isomorphism causes extensive replacement of one element by another. Non-isomorphous substances may also form solid solutions of mix-crystal type. Finally the instability of minerals may result in alteration, and accordingly in variability in composition. Many illustrations of these relations are cited. E. T. W.

DIAMONDS OF SMITH'S FLAT. Burr Evans, of Placerville, Cal. *Eng. Mining J.* **102**, (19), 814–815, 1916.

A record of the finding of diamonds in Tertiary gravels at this place in Eldorado Co., Cal. The size, color, weight, and disposition of some 33 diamonds are tabulated, and it is stated that in all at least 47 genuine stones have been found, some of them over a carat in weight. The original source of these stones is unknown, being probably covered by the lava and volcanic ash which appears at the surface over most of the region. E. T. W.

SOME NOTES ON JAPANESE MINERALS. S. Ichikawa. *Am. J. Sci.*, [4], **42**, (2) 111–119, 1916.

Comprises articles on: Natural etching of galena crystals; natural etching of calcite crystals; pinite: a mica pseudomorph after cordierite in trillings from Torihama; and on the crystal-aggregates of native arsenic. S. G. G.

COMPOSITION OF SELENSULFUR FROM HAWAII. Glenn V. Brown, of Bucknell Univ. *Am. J. Sci.*, [4], **42**, (2), 132–134, 1916.

An analysis of selensulfur, occurring as minute needle-like crystals and orange-red to sulfur-yellow crystalline impregnations in a slaggy, vesicular lava, gave the following results: moisture 3.16, S 12.44, Se 0.68, insoluble 83.72%, which when recalculated gives S 94.82, Se 5.18 or S: Se = 45.5: 1.

This mineral can hardly be considered more than a variety of sulfur, and Prof. Brown suggests that the term "seleniferous sulfur" would be more appropriate than selensulfur. S. G. G.

MINERALOGICAL NOTES. B. K. Emerson, of Amherst College. *Am. J. Sci.*, [4], **42**, (3), 233–234, 1916.

A brief description of anhydrite occurring in bluish-white tabular aggregates in trap at Larrabee's Quarry on the north line of Holyoke, and the third Westfield quarry, Old Hampshire Co., Mass., associated with pyrite, calcite, diabantite, and limonite. The latter mineral is a pseudomorph after diabantite, which in turn replaces anhydrite.

The following paragenesis was observed:

A. Quarry No. 1, Westfield. Anhydrite, calcite, datolite, solution of anhydrite, diabantite replacing anhydrite, calcite, chalcedony, calcite, change of diabantite to limonite.

B. Cheapside quarry, Greenfield. Anhydrite, quartz, solution of anhydrite.

C. Anhydrite, datolite and calcite, calcite, solution of anhydrite.

S. G. G.

SULFATIC CANCRINITE FROM COLORADO. Esper S. Larsen and George Steiger, of the U. S. Geological Survey. *Am. J. Sci.*, [4], **42**, (4), 332–334, 1916.

A number of specimens of uncompahgrite (a coarse-grained igneous rock made up largely of melilite with considerable pyroxene, magnetite, perovskite and apatite) collected from Beaver Creek, a tributary of Cebolla Creek, on the Uncompahgre quadrangle, Gunnison Co., Colo., showed cancrinite (apparently derived from the original melilite) in which nearly half the CO_3 was replaced by SO_4.

Physical properties.—Nearly colorless. H about 5. Sp. Gr. 2.443. Cleavage, one—poorly developed || to the prism faces; rod-like inclusions and negative crystals are commonly arranged in the same direction.

Optical properties.—Optically +; $\omega = 1.509$, $\epsilon = 1.500$, $\omega - \epsilon$ .009, (all ± .002).

Chemical properties.—Analysis by Steiger gave: SiO_2 33.70, Al_2O_3 29.40, CaO 4.18, Na_2O 18.52, K_2O 1.45, H_2O- .72, H_2O 4.24, TiO_2 .07, CO_2 3.18, SO_3 4.65, SrO .08, sum 100.19. Fuses readily with intumescence; readily soluble in acid with effervescence, yielding gelatinous silica on heating.

The data as yet available are not sufficient to show clearly the relation between cancrinite and sulfatic cancrinite. It is suggested, however, that they may form a complete isomorphous series from normal cancrinite to a mineral in which all the carbonate is replaced by sulfate, the sulfatic cancrinite described above representing an intermediate compound. Sulfatic cancrinite has a much lower birefringence than cancrinite, and it is not unlikely that a member of the group somewhat richer in sulfate has zero birefringence and that the pure sulfate member is optically negative. S. G. G.

THE SO-CALLED GRAPHIC INTERGROWTHS OF BORNITE AND CHALCOCITE. Austin F. Rogers, of Stanford University. *Econ. Geol.* **11**, (6), 582–593, 1916.

The author describes bornite-chalcocite aggregates from six localities, and concludes that: 1. The so-called graphic intergrowth of bornite and chalcocite is the result of a local, very irregular replacement of bornite by chalcocite or is the result of the replacement of such minerals as klaprotholite ($Cu_6Bi_4S_9$) which in turn had replaced bornite at an earlier stage; 2. This irregular replacement is the result of ascending solutions, and is probably brought about by a decrease in temperature as well as by a change in the character of the solutions. S. G. G.

OPTICALLY POSITIVE CORDIERITE. I. C. Chacko, State Geologist, Trivandrum, Government of Travancore, South India. *Geol. Mag.*, [6], **3**, (10), 462–464, 1916.

Cordierite (iolite) was found as violet particles or spots at Teruwulla, Travancore, in a kind of diorite, associated with monazite, magnetite or ilmenite, garnet and biotite. In sections the mineral shows numerous globular inclusions surrounded by pleochroic halos, the larger identifiable as monazite. Some of the cordierite gives a positive figure, probably due to the increase of the value of 2V beyond 90°; 2V being very variable in cordierite—the lower the refractive index, the greater this value. No section was found suitable for the determination of 2V, but as the refractive index was determined approximately as 1.53, it was concluded that 2V is probably large. Particles that floated in a heavy solution in which a quartz crystal would just sink gave: H_2O 1.74, SiO_2 49.74, Fe_2O_3 5.65, FeO 3.00, Al_2O_3 35.21, CaO 1.05, MgO 4.30, total 100.69. The Fe_2O_3 content is remarkable, but there is a possibility of error in the determination of the iron oxides. S. G. G.

ZIRCON-BEARING PEGMATITES IN VIRGINIA. Thomas L. Watson, of the Va. Geol. Survey. *Bull. Am. Inst. Mining Eng.*, (July), **1916**, 1237–1243. Abstract by P. A. v. d. Meulen, reprinted by permission from *Chemical Abstracts*, **10**, (18), 2336, 1916.

Zircon occurs in pegmatite cutting a biotite gneiss in Amelia and Hanover counties. The interesting features in these localities are the occurrence of zircon in massive forms of unusual size, and its association in the two localities with an entirely different group of rarer minerals, altho the pegmatites of each area are of granitic composition. The pegmatites of the Amelia Co. area contain orthoclase, microcline, albite, quartz, and muscovite with the rarer minerals fluorite, spessartite, black tourmaline, beryl, helvite, allanite, zircon, columbite, microlite, apatite, and monazite; those of the Hanover Co. area contain both K and Ca-Na feldspars, quartz, muscovite, and biotite, and as the rarer constituents original rutile, sometimes in large masses, ilmenite, and occasional apatite.

EXCHANGE NOTICES

Exchange notices will be printed free of charge to our subscribers in this column for three months, or three times a year, as desired.

B. C. Beegle, 52 Chadwick Ave., Newark, N. J. Zeolites and associated minerals from the well known Watchung Mountain zeolite deposits.

John Holzman, 182 Ridgewood Ave., Newark, N. J. Zeolites and associated minerals; write for list.

A. Van De Graaff, P. O. Box 375, Ogden, Utah. Oolitic sand from Great Salt Lake (as described in all the larger Geology text-books) offered for any geological specimen accompanied with descriptions.